



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/611,308	07/02/2003	Zhong Stella Wu	146712004100	3962
25227	7590	11/02/2004	EXAMINER	
MORRISON & FOERSTER LLP 1650 TYSONS BOULEVARD SUITE 300 MCLEAN, VA 22102			BERNATZ, KEVIN M	
			ART UNIT	PAPER NUMBER
			1773	

DATE MAILED: 11/02/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/611,308

Applicant(s)

WU ET AL.

Examiner

Kevin M Bernatz

Art Unit

1773

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☐ Responsive to communication(s) filed on ____.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-21 is/are pending in the application.
- 4a) Of the above claim(s) ____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) ____ is/are allowed.
- 6) ☒ Claim(s) 1-8, 11-18 and 21 is/are rejected.
- 7) ☒ Claim(s) 4, 9, 10, 14, 19 and 20 is/are objected to.
- 8) ☐ Claim(s) ____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on ____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. ____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date 7/2/03.
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. ____.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: ____.

DETAILED ACTION

Examiner's Comments

1. Claim 21 recite(s) the limitation(s) "means for producing an easy magnetization axis tilted away from a plane of the substrate", which (is/are) means-plus-function limitations. The Examiner notes that the corresponding structure disclosed to meet the means-plus-function language is: an hcp magnetic layer possessing a (101-2) lattice plane which is parallel to the substrate surface (*specification, Paragraph 0026*)..

The Examiner notes that the following are deemed equivalent structures to the disclosed corresponding structure: any magnetic layer structure wherein the easy axis of magnetization is disclosed to be tilted away from the plane of the substrate (i.e. any angle other than 0 degrees), regardless of the material of the magnetic layer.

Should applicant(s) disagree with the Examiner's interpretation of the corresponding or equivalent structures, applicant(s) should provide a clear and concise reasoning behind the disagreement, including column and line cites from the as-filed disclosure supporting their alternative definition(s).

Claim Objections

2. Claims 4 and 14 are objected to under 37 CFR 1.75(c), as being of improper dependent form for failing to further limit the subject matter of a previous claim.

Applicant is required to cancel the claim(s), or amend the claim(s) to place the claim(s) in proper dependent form, or rewrite the claim(s) in independent form. The Examiner

Art Unit: 1773

notes since the (101-2) plane is *parallel* to the substrate, if the easy magnetization axis is tilted 45° from the (101-2) plane, the easy magnetization axis is **necessarily** tilted 45° from the surface of the substrate. The definition of parallel is that there is zero difference between the angle of the surface of the layers (see Figure 1 (B) below).

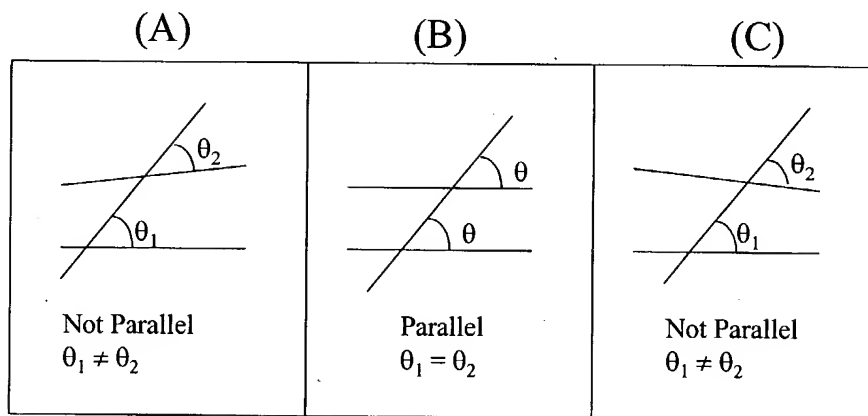


Figure 1: Illustration of angular dependence of two parallel layers

3. Claims 9, 10, 19 and 20 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

Claim Rejections - 35 USC § 102

4. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(a) the invention was known or used by others in this country, or patented or described in a printed publication in this or a foreign country, before the invention thereof by the applicant for a patent.

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

5. Claim 21 is rejected under 35 U.S.C. 102(b) as being anticipated by Iwasaki et al. (U.S. Patent No. 4,210,946).

Regarding claim 21, Iwasaki et al. disclose a magnetic recording medium (*Title*) comprising a substrate and means for producing an easy magnetization axis tilted away from a plane of the substrate (*Abstract* – “has an easy axis of magnetization perpendicular to the surface of the magnetic recording layer”).

6. Claims 1 – 5, 11 – 15 and 21 are rejected under 35 U.S.C. 102(b) as being anticipated by Futamoto (JP 08-007250 A), as evidenced by applicants' admissions. See provided EPO and Machine Translation of JP '250 A.

Regarding claims 1 – 4, 11 – 14 and 21, Futamoto discloses a method of making a magnetic recording medium (*Title*) comprising a substrate (*Figure 1, element 11*) and a Co-alloy magnetic layer (*element 13*) wherein the easy axis of magnetization is the

incident angle of deposition and is equal to 20 – 50 degrees from a line normal to the substrate surface (*Claim 1 and Paragraphs 0012, 0020, 0021 and 0026*).

Regarding the limitation “a magnetic layer with an hcp (101-2) plane being parallel to the surface of the substrate, wherein an easy magnetization axis in the magnetic layer is tilted away from the (101-2) plane”, it has been held that where claimed and prior art products are identical or substantially identical in structure or composition, or are produced by identical or substantially identical processes, a *prima facie* case of either anticipation or obviousness has been established and the burden of proof is shifted to applicant to show that prior art products do not necessarily or inherently possess characteristics of claimed products where the rejection is based on inherency under 35 USC 102 or on *prima facie* obviousness under 35 USC 103, jointly or alternatively. Therefore, the *prima facie* case can be rebutted by **evidence** showing that the prior art products do not necessarily possess the characteristics of the claimed product. *In re Best*, 562 F.2d 1252, 1255, 195 USPQ 430, 433 (CCPA 1977). “When the PTO shows a sound basis for believing that the products of the applicant and the prior art are the same, the applicant has the burden of showing that they are not.” *In re Spada*, 911 F.2d 705, 709, 15 USPQ2d 1655, 1658 (Fed. Cir. 1990).

In the instant case, the Examiner notes that applicants admit that the hcp Co alloys have a “magnetic easy axis along c-axis that is 46.84° away from the (101-2) plane” (*Paragraph 0027 of specification*). As such, while Futamoto fails to teach controlling the (101-2) plane to be parallel to the substrate surface, Futamoto *does*

teach controlling the easy axis of magnetization such that it is $\sim 45^\circ$ from a line normal to the substrate surface (*Paragraph 0020 and Figures*).

Therefore, in addition to the above disclosed limitations, the presently claimed property of “an hcp (101-2) plane being parallel to the surface of the substrate wherein an easy magnetization axis in the magnetic layer is tilted away from the (101-2) plane” would have inherently been present in the embodiments with an easy magnetization axis tilted $\sim 45^\circ$ from the substrate surface since applicants’ admit that when the easy axis of magnetization is tilted $\sim 45^\circ$ from the substrate surface, the (101-2) plane falls parallel to the substrate surface.

Regarding claims 5, 7, 8, 15, 17 and 18, Futamoto discloses an underlayer deposited under the Co-alloy magnetic layer to control the growth of the magnetic layer (*Paragraphs 0008 – 0010 and Figures*). Regarding the limitation(s) “substantially matches” in claims 5 and 15, the Examiner has given the term(s) the broadest reasonable interpretation(s) consistent with the written description in applicants’ specification as it would be interpreted by one of ordinary skill in the art. *In re Morris*, 127 F.3d 1048, 1054-55, 44 USPQ2d 1023, 1027 (Fed. Cir. 1997); *In re Donaldson Co., Inc.*, 16 F.3d 1190, 1192-95, 29 USPQ2d 1845, 1848-50 (Fed. Cir. 1994). See MPEP 2111. Specifically, the Examiner notes that as long as the underlayer is capable of seeding the growth of a layer such that it is useable as a magnetic recording layer, that one of ordinary skill in the art would recognize that such layers would be deemed “substantially” matched.

Art Unit: 1773

7. Claims 1 – 8, 11 – 18 and 21 are rejected under 35 U.S.C. 102(b) as being anticipated by Honda et al. (U.S. Patent No. 5,851,643), as evidenced by applicants' admissions.

Regarding claims 1 – 4, 11 – 14 and 21, Honda et al. disclose a method of making a magnetic recording medium (*Title*) comprising a substrate (*Figure 12, element 21*) and a Co-alloy magnetic layer (*element 23 and col. 23, lines 20 - 22*) wherein the easy axis of magnetization is the incident angle of deposition and is equal to 0 - 45 degrees from a line normal to the substrate surface (*col. 23, lines 15 - 49*).

Regarding the limitation "a magnetic layer with an hcp (101-2) plane being parallel to the surface of the substrate, wherein an easy magnetization axis in the magnetic layer is tilted away from the (101-2) plane", the Examiner notes that applicants admit that the hcp Co alloys have a "magnetic easy axis along c-axis that is 46.84° away from the (101-2) plane" (*Paragraph 0027 of specification*). As such, while Honda et al. fail to teach controlling the (101-2) plane to be parallel to the substrate surface, Honda et al. does teach controlling the easy axis of magnetization such that it is ~45° from a line normal to the substrate surface (*col. 23, lines 15 - 18*).

Therefore, in addition to the above disclosed limitations, the presently claimed property of "an hcp (101-2) plane being parallel to the surface of the substrate wherein an easy magnetization axis in the magnetic layer is tilted away from the (101-2) plane" would have inherently been present in the embodiments with an easy magnetization axis tilted ~ 45° from the substrate surface since applicants' admit that when the easy

Art Unit: 1773

axis of magnetization is tilted $\sim 45^\circ$ from the substrate surface, the (101-2) plane falls parallel to the substrate surface.

Regarding claims 5 – 8 and 15 - 18, Honda et al. disclose an underlayer deposited under the Co-alloy magnetic layer wherein the underlayer has a lattice mismatch meeting applicants' claimed range in order to form fine crystals in the magnetic layer (*Figure 12, element 22 and col. 12, lines 47 - 63*).

8. Claims 1 – 5, 7, 8, 11 – 15, 17, 18 and 21 are rejected under 35 U.S.C. 102(a) and 102(e) as being anticipated by Kikitsu et al. (U.S. Patent App. No. 2003/0017364 A1).

Regarding claims 1 – 4, 11 – 14 and 21, Kikitsu et al. discloses a method of making a magnetic recording medium (*Title*) comprising a substrate (*Paragraph 0050* and a Co-alloy magnetic layer (*Paragraphs 0051, 0052, 0067 and 0073 – e.g. Co-alloy magnetic functional layer*) wherein the easy axis of magnetization of the functional layer (i.e. applicants' "magnetic layer") is tilted away from the substrate surface (*Paragraphs 0052, 0070, 0079, 0083, 0107 and 0237 – "FePt-B functional layer ... orientation of the magnetic anisotropy of the functional layer (12) stood up by 45 degrees relative to the substrate"*).

Regarding the limitation "a magnetic layer with an hcp (101-2) plane being parallel to the surface of the substrate, wherein an easy magnetization axis in the magnetic layer is tilted away from the (101-2) plane", the Examiner notes that applicants admit that the hcp Co alloys have a "magnetic easy axis along c-axis that is 46.84°

Art Unit: 1773

away from the (101-2) plane" (*Paragraph 0027 of specification*). As such, while Kikitsu et al. fail to teach controlling the (101-2) plane to be parallel to the substrate surface, Kikitsu et al. does teach controlling the easy axis of magnetization such that it is $\sim 45^\circ$ from a line normal to the substrate surface (*Paragraph 0052, 0070, 0079, 0083, 0107 and 0237*).

Therefore, in addition to the above disclosed limitations, the presently claimed property of "an hcp (101-2) plane being parallel to the surface of the substrate wherein an easy magnetization axis in the magnetic layer is tilted away from the (101-2) plane" would have inherently been present in the embodiments with an easy magnetization axis tilted $\sim 45^\circ$ from the substrate surface since applicants' admit that when the easy axis of magnetization is tilted $\sim 45^\circ$ from the substrate surface, the (101-2) plane falls parallel to the substrate surface.

Regarding claims 5, 7, 8, 15, 17 and 18, Kikitsu et al. disclose an underlayer deposited under the Co-alloy magnetic layer to control the growth of the magnetic layer (*Paragraphs 0087 and 0090*). Regarding the limitation(s) "substantially matches" in claims 5 and 15, the Examiner notes that as long as the underlayer is capable of seeding the growth of a layer such that it is useable as a magnetic recording layer, that one of ordinary skill in the art would recognize that such layers would be deemed "substantially" matched.

9. Claims 1 – 4, 11 – 14 and 21 are rejected under 35 U.S.C. 102(e) as being anticipated by anticipated Akagi et al. (U.S. Patent No. 6,671,116 B2).

Regarding claims 1 – 4, 11 – 14 and 21, Akagi et al. disclose a method of making a magnetic recording medium (*Title*) comprising a substrate (*col. 2, lines 42 - 45*) and a Co-alloy magnetic layer (*example 2*) wherein the easy axis of magnetization of the magnetic layer is three-dimensionally distributed including “an axis of easy magnetization is inclined in the film thickness direction relative to the film surface” (*col. 2, lines 56 – 60*).

Regarding the limitation “a magnetic layer with an hcp (101-2) plane being parallel to the surface of the substrate, wherein an easy magnetization axis in the magnetic layer is tilted away from the (101-2) plane”, the Examiner notes that applicants admit that the hcp Co alloys have a “magnetic easy axis along c-axis that is 46.84° away from the (101-2) plane” (*Paragraph 0027 of specification*). As such, while Akagi et al. fail to teach controlling the (101-2) plane to be parallel to the substrate surface, Akagi et al. does provide sound basis that at least some of the magnetization directions in the embodiments disclosed by Akagi et al. would possess “an hcp (101-2) plane being parallel to the surface of the substrate” (*emphasis added*) since Akagi et al. explicitly teaches that the axis of easy magnetizations are randomly distributed in three dimensions, including being inclined from the substrate surface in the film thickness direction (*col. 2, lines 56 – 60 and example 2*).

Therefore, in addition to the above disclosed limitations, the presently claimed property of “an hcp (101-2) plane being parallel to the surface of the substrate wherein

Art Unit: 1773

an easy magnetization axis in the magnetic layer is tilted away from the (101-2) plane” would have inherently been present in the embodiments with an easy magnetization axis tilted $\sim 45^\circ$ from the substrate surface since applicants’ admit that when the easy axis of magnetization is tilted $\sim 45^\circ$ from the substrate surface, the (101-2) plane falls parallel to the substrate surface and applicants’ claims are open to other hcp (101-2) plane orientations also being present in the magnetic layer.

Claim Rejections - 35 USC § 103

10. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

11. Claims 6 and 16 are rejected under 35 U.S.C. 103(a) as being unpatentable over Futamoto as applied above, and further in view of Honda et al. ('643).

Futamoto is relied upon as described above.

Futamoto fails to disclose a lattice mismatch percentage meeting applicants’ claimed range limitation.

However, Honda et al. disclose an underlayer deposited under the Co-alloy magnetic layer wherein the underlayer has a lattice mismatch meeting applicants’ claimed range in order to form fine crystals in the magnetic layer (*Figure 12, element 22 and col. 12, lines 47 - 63*).

It would therefore have been obvious to one of ordinary skill in the art at the time of the applicant's invention to modify the device of Futamoto to control the lattice mismatch between the underlayer and the magnetic layer to meet applicants' claimed range limitations as taught by Honda et al. in order to form fine crystals in the magnetic layer.

12. Claims 6 and 16 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kikitsu et al. as applied above, and further in view of Honda et al. ('643).

Kikitsu et al. is relied upon as described above.

Kikitsu et al. fail to disclose a lattice mismatch percentage meeting applicants' claimed range limitation.

However, Honda et al. disclose an underlayer deposited under the Co-alloy magnetic layer wherein the underlayer has a lattice mismatch meeting applicants' claimed range in order to form fine crystals in the magnetic layer (*Figure 12, element 22 and col. 12, lines 47 - 63*).

It would therefore have been obvious to one of ordinary skill in the art at the time of the applicant's invention to modify the device of Kikitsu et al. to control the lattice mismatch between the underlayer and the magnetic layer to meet applicants' claimed range limitations as taught by Honda et al. in order to form fine crystals in the magnetic layer.

Allowable Subject Matter

13. The following is a statement of reasons for the indication of allowable subject matter: claims 9, 10, 19 and 20 require an underlayer possessing an fcc lattice structure which is neither disclosed nor rendered obvious by the prior art of record.

Conclusion

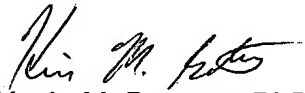
14. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. JP 55-091105-A is another reference which teaches depositing the magnetic layer such that the easy axis of magnetization is tilted out of the plane of the substrate from 0 – 45° (*Derwent Abstract Translation*).

15. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Kevin M Bernatz whose telephone number is (571) 272-1505. The examiner can normally be reached on M-F, 9:00 AM - 6:00 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Deborah Jones can be reached on (571) 272-1535. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Art Unit: 1773

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).



Kevin M. Bernatz, PhD.
Primary Examiner

October 28, 2004